AMENDMENT TO THE CLAIMS

Claims 1 and 2 (Canceled)

3. (Previously Presented) The method according to Claim 21 wherein the multivariate integration domain is determined by finding an integration area by computing zeros of the integrand.

4. (Previously Presented) The method according to Claim 21 wherein the integration points and the integration weights are determined dynamically or adaptively when evaluating the integrand.

5. (Previously Presented) The method according to Claim 21 wherein the at least one processor computes the multivariate integration domain as a plurality of partial integrals.

6. (Previously Presented) The method according to Claim 21 wherein the at least one processor computes in parallel at least one of the integration points, the integration weights, the evaluation of the integrand and the combination of the integrand values.

7. (Previously Presented) The method according to Claim 21 wherein a dimension of integrals is reduced to accelerate the method.

8. (Previously Presented) The method according to Claim 21 wherein at least one second expectation is computed, and the expectation and the at least one second expectation are combined.

9. (Previously Presented) The method according to Claim 21 wherein one of a keyboard input and an input device is used to input the input parameters.

10. (Previously Presented) The method according to Claim 21 wherein the integrand is evaluated by integrating the integrand.

11. (Previously Presented) The method according to Claim 21 wherein the value of the option is communicated as at least one of a digital signal and an analog signal and the value is displayed on at least one of a monitor and an output device.

12. (Currently Amended) A device for valuation of financial derivatives with options, wherein a value of a derivative with an option is computed by a determination of an expectation, the device comprising:

an input unit communicating a plurality of input parameters ~~of the derivative with~~ specifying the payoffs of the option to a computer;

the computer comprising:

a setup module for establishing a multivariate integrand representing the option payoffs as a mathematical function of the input parameters and computing a multivariate integration domain representing a region where the option payoffs are zero ~~an integrand as a function of the input parameters and computing a multivariate integration domain~~,

a discretization module ~~applying~~ for computing by a sparse grid quadrature method ~~to determine~~ a plurality of integration points inside the multivariate integration domain and a plurality of corresponding integration weights ~~as a function of the input parameters~~, and

an integration module for evaluating the multivariate integrand inside the integration domain at the integration points and computing a plurality of integrand values each representing an option payoff, computing an expected value of all option payoffs by a summation of these integrand values multiplied by the corresponding integration weights, and computing the value of the option by discounting the expectation ~~determining an integration domain and evaluating the integrand inside the integration domain at the integration points to~~

~~determine a plurality of integrand values and computing an expectation by combining the integrand values and the integration weights~~; and

an output unit for communicating [[a]] the value of ~~the derivative with~~ the option.

13. (Original) In the device according to Claim 12 wherein the input unit communicates the input parameters and the output unit communicates the value as at least one of a digital signal and an analog signal.

14. (Original) In the device according to Claim 12 wherein the computer comprises at least one processor computing the integration domain as a plurality of partial integrals.

15. (Original) In the device according to Claim 12 wherein the computer comprises a plurality of processors computing in parallel at least one of the integration points, the integration weights, the evaluation of the integrand and the combination of the integrand values.

16. (Original) In the device according to Claim 12 wherein the input unit comprises one of a keyboard input and an input device for inputting the input parameters.

17. (Original) In the device according to Claim 12 wherein the computer communicates the value of the derivative as at least one of a digital signal and an analog signal.

18. (Original) In the device according to Claim 12 wherein the output unit comprises at least one of a monitor and an output device.

19. (Previously Presented) In the device according to Claim 12 wherein the integration module determines the integration domain by computing discontinuities of the integrand.

20. (Previously Presented) In the device according to Claim 12 wherein the integration module determines the integration domain by finding an integration area by computing zeros of the integrand.

21. (Currently Amended) A method for valuation of financial options by a data processor, wherein a value of an option is computed by a determination of an expectation by the data processor, the method comprising:

receiving a plurality of input parameters [[of]] specifying the option;

constructing a multivariate integrand representing option payoffs as a mathematical function of the input parameters;

determining a multivariate integration domain representing the region where the option payoffs are nonzero by computing discontinuities of the multivariate integrand;

~~applying~~ constructing by a sparse grid quadrature method ~~to determine~~ a plurality of integration points inside the multivariate integration domain and a plurality of integration weights;

~~evaluating an integrand at each of the integration points to determine~~ determining a plurality of integrand values each representing an option payoff by evaluating the multivariate integrand at each of the integration points;

~~computing an expectation by combining the integrand values and the integration weights and determining a value of the option from the expectation~~ determining an expected value of all option payoffs by the summation of the integrand values multiplied by the corresponding integration weights;

determining the value of the option by discounting the expected value; and

outputting the value of the option.

22. (New) A method for valuation of financial options by a data processor, wherein a value of an option is computed by a determination of an expectation by the data processor, the method comprising:

receiving a plurality of input parameters specifying underlying values of the option;

constructing a multivariate integrand representing option payoffs as a mathematical function of the input parameters;

determining a multivariate integration domain representing the region where the option payoffs are nonzero by computing discontinuities of the multivariate integrand;

constructing using a sparse grid a plurality of integration points inside the multivariate integration domain and a plurality of integration weights;

determining a plurality of integrand values each representing an option payoff by evaluating the multivariate integrand at each of the integration points;

determining an expected value of all option payoffs by the summation of the integrand values multiplied by the corresponding integration weights;

determining the value of the option by discounting the expected value; and

outputting the value of the option.